

WHAT IS CLAIMED IS:

1. A catheter for performing an intravascular procedure, comprising
a catheter shaft having

- 5 a) an inner tubular member defining a first lumen;
- b) an outer tubular member disposed about the inner tubular
member to form a second lumen; and
- c) a side wall which extends longitudinally within the second
lumen and which defines a third lumen configured to receive a mandrel.

10

2. The catheter of claim 1 wherein the sidewall extends along an
outer surface of at least a portion of the inner tubular member.

3. The catheter of claim 1 wherein the sidewall extends along an
15 inner surface of at least a portion of the outer tubular member.

4. The catheter of claim 3 including a mandrel secured within the
mandrel lumen.

20 5. The catheter of claim 4, wherein the mandrel has tapered ends.

6. The catheter of claim 5, wherein the tapered ends of the
mandrel are about 1 to about 7 centimeters long.

7. The catheter of claim 4, wherein the mandrel is about 7 to about 120 centimeters long.

5 8. The catheter of claim 4, wherein the mandrel is secured within the mandrel lumen by heat deformation of the sidewall.

9. The catheter of claim 4, wherein the mandrel has a proximal end and a distal end and is secured to the outer tubular member at a point
10 adjacent the proximal end of the mandrel and at a point adjacent the distal end of the mandrel.

10. The catheter of claim 4, wherein the mandrel has a proximal end, a distal end, and a length extending therebetween, and the mandrel is
15 secured to the outer tubular member along the length of the mandrel.

11. The catheter of claim 4 wherein the mandrel lumen is annular and has an inner diameter which is not substantially larger than an outer diameter of the mandrel.

20

12. The catheter of claim 3 wherein the mandrel lumen proximal end is distal to the proximal end of the catheter outer tubular member.

13. The catheter of claim 12, wherein the mandrel lumen is about 0.5 to about 15 centimeters long.

14. The catheter of claim 12 wherein the outer tubular member has
5 a proximal portion, a distal portion, and an intermediate portion
therebetween, and wherein the mandrel lumen is within the intermediate
portion.

15. The catheter of claim 14, wherein the intermediate portion with
10 the mandrel within the mandrel lumen therein is relatively more stiff than the
proximal portion and the distal portion.

16. The catheter of claim 3 wherein the mandrel lumen extends to
the proximal end of the outer tubular member.
15

17. The catheter of claim 16 wherein the mandrel lumen is about
110 to about 125 cm long.

18. The catheter of claim 16 including a mandrel disposed within
20 the mandrel lumen.

19. The catheter of claim 16, wherein the mandrel is exchangeable.

20. A balloon catheter for performing an intravascular procedure comprising an inner tubular member defining a guidewire lumen and an outer tubular member disposed about the inner tubular member to define an inflation lumen, wherein the outer tubular member comprises:

- 5 a) a proximal portion;
- b) a distal portion having an inflatable member in fluid communication with the inflation lumen; and
- c) an intermediate portion having a sidewall defining a mandrel lumen extending longitudinally along an inner surface of the outer
- 10 tubular member; and
- d) a mandrel in the mandrel lumen.

21. The catheter of claim 20, wherein the mandrel is formed from a material selected from the group consisting of stainless steel, nickel titanium

15 PEEK, PEI, nylon, and reinforced composite rod.

22. The catheter of claim 21 wherein the mandrel length is about 25% to about 95% less than a length of the catheter length.

20 23. A catheter for performing an intravascular procedure, comprising

- a) a catheter shaft having an inner tubular member defining a guidewire lumen and an outer tubular member disposed about the inner tubular member to form an inflation lumen; and

b) a mandrel having a proximal end, a distal end, and a length, the mandrel being disposed within the outer tubular member and secured to the catheter shaft at least at the proximal end and the distal end of the mandrel.

5

24. The catheter of claim 23 wherein the mandrel is secured to the catheter shaft along the length of the mandrel from the proximal end to the distal end of the mandrel.

10 25. The catheter of claim 23, wherein the mandrel is secured to an inner surface of the outer tubular member.

26. The catheter of claim 23, wherein the mandrel is secured to an outer surface of the inner tubular member.

15

27. A balloon catheter for performing an intravascular procedure comprising:

20 a) an elongated proximal tubular member defining a first inflation lumen, and having a sidewall defining a mandrel lumen extending longitudinally along an inner surface of the proximal tubular member within the first inflation lumen;

b) an inner tubular member defining a guidewire lumen, having a proximal end disposed adjacent to a portion of the proximal tubular member, and a distal end;

25 c) a distal tubular member defining a second inflation lumen and having a proximal end disposed over the adjacent inner tubular

member and the proximal tubular member so that the first and second inflation lumens are in communication, and a distal end; and

d) an inflatable member secured to the distal tubular member in communication with the first and second inflation lumens.

5

28. The catheter of claim 27 wherein the inner tubular member proximal end is proximal to the distal end of the mandrel lumen.

29. The catheter of claim 27 having a support mandrel disposed
10 within the mandrel lumen.

30. The catheter of claim 29 wherein the distal end of the mandrel is proximal to the distal end of the distal tubular member.